

Current Imaging of III-Nitride Films

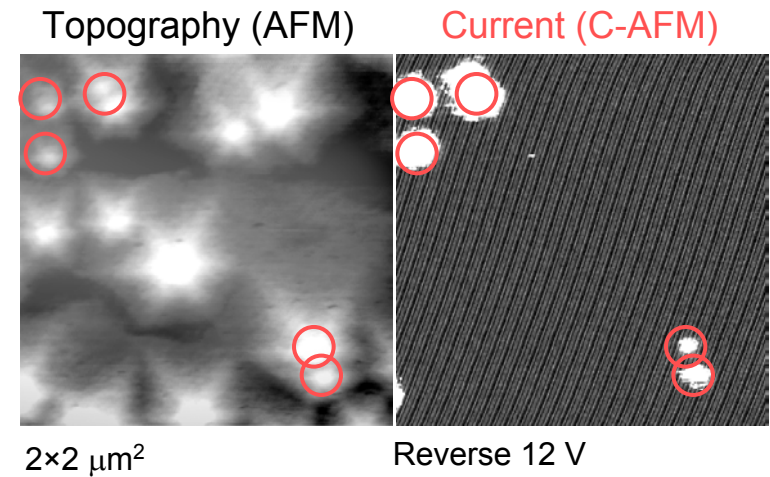
Hadis Morkoç and Alison Baski, Virginia Commonwealth University, DMR 0309095

GaN-based semiconductors have great technological potential in **optoelectronic** and high power, high frequency devices.

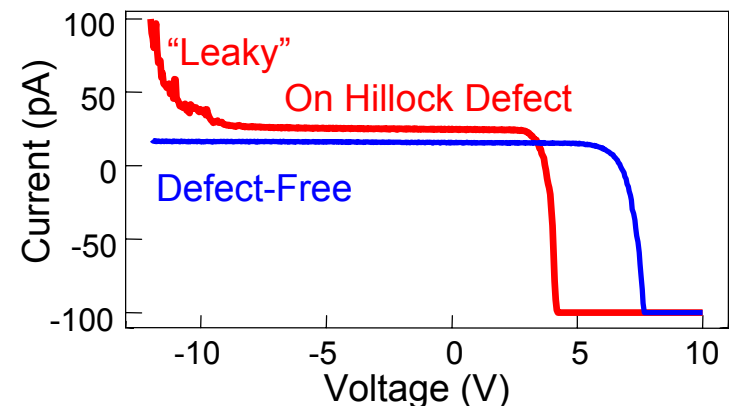
However, the performance of such devices can be **limited** by factors such as **current leakage**.

We investigate such leakage on the **nanometer scale** in order to better characterize a film's conduction behavior.

These studies allow us to better understand and **optimize film growth** to produce higher quality films and devices.



AFM images show hillocks due to threading dislocations, and C-AFM indicates current leakage (bright areas) at the centers of select hillocks.



Local I-V spectra of a defective hillock (red) as compared to a defect-free area (blue).

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Education

This grant supports one component of a comprehensive research program that involves the growth, characterization, and device fabrication of III-nitride films.

This component concerns local charge and current imaging of the films and involves the efforts of [two graduate students](#) (Shahriar Sabuktagmin, Josh Spradlin), and [two undergraduates](#) (Matt Sievert, Kabongo Ngandu).

NSF funds provide partial support of the graduate students and undergraduates.

Outreach

The undergraduates involved in this grant have also been involved with outreach activities during the summer. In particular, they have helped Dr. Baski to teach [physical science lessons](#) to 200 disadvantaged students in the [National Youth Sports Program](#) held each summer at VCU.



NYSP students are [predicting](#) whether various materials are magnetic, and then using a magnet to test their predictions.